UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/446,641	12/22/1999	TSUYONOBU HATAZAWA	P99.2641	2680

26263 7590 08/20/2003

SONNENSCHEIN NATH & ROSENTHAL LLP
P.O. BOX 061080
WACKER DRIVE STATION, SEARS TOWER
CHICAGO, IL 60606-1080

EXAMINER
DOVE, TRACY MAE

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 08/20/2003

23

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/446,641	HATAZAWA ET AL.	
	Examiner	Art Unit	
	Tracy Dove	1745	

-- The MAILING DATE of this communication app ars on the cover sheet with th correspondence address --

P riod for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10 and 13-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10 and 13-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 December 1999* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

This Office Action is in response to the communication filed on 6/27/03. Applicant's arguments have been considered, but are not persuasive. Claims 10 and 13-17 are pending. Claims 1-9, 11, 12, 18 and 19 have been canceled.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/27/03 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites "wherein the fluorocarbon polymer is polyvinylidene or polyvinylidene/ hexafluoropropylene copolymer", which is indefinite because it is unclear which "fluorocarbon polymer" of claim 10 is being further limited.

Claims Analysis

Note the specification states the plasticizer or solvent may comprise an ester, ether or carbonate and the solvent is removed to solidify the electrolyte (page 8, lines 5-9 and page 11,

lines 19-21). Thus, a plasticizer is interpreted as any ester, ether or carbonate compound. Thus, a solvent is interpreted as any ester, ether or carbonate compound. Furthermore, the limitation of "a solvent" is a product-by-process limitation because the solvent is removed to solidify the electrolyte. Specifically, the solvent (as recited in the specification) is not present in the solid-electrolyte secondary battery (product).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 10, 13 and 15-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 4-6, 8, 10 and 11 of U.S. Patent No. 6,506,523 B1. Although the conflicting claims are not identical, they are not patentably distinct from each other because the salt concentration of the patent encompasses the salt concentration of the instant application. Furthermore, the hexafluoropropylene (second fluorocarbon) comprises from 3-7.5% by weight, thus, the vinylidene fluoride (first fluorocarbon) comprises from 92.5-97% by weight (encompassed by 30 wt% or more of the instant application). See claim 10 (note claim 4) of the patent regarding claims 15 and 16 of the instant application and see claim 11 of the patent regarding claim 17 of the instant invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10 and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gao et al., US 5,756,230 in view of Andrieu et al., US 5,811,205.

Gao teaches a method of improving the structural integrity of an electrode binder and a polymeric matrix component of an electrochemical cell by employing polymer blends comprising fluoropolymers. See abstract. With the inventive fluoropolymer blends of Gao, the polymer binders of the anode and cathode and the polymeric layer of the electrolyte (solid) do not become brittle and crack under stress. See col. 2, lines 1-38. The fluoropolymer blends are described in col. 4, lines 19-67. The individual polymers of the blend may be homopolymers having a molecular weight in the range of 50,000 to 900,000, copolymers having a molecular weight in the range of 10,000 to 900,000 or terpolymers having a molecular weight in the range of 10,000 to 900,000. Note polytetrafluoroethylene and polyvinyl fluorides are preferred homopolymers and polyvinylidene fluoride-hexafluoropropylene is a preferred copolymer. For blends comprising a homopolymer and a copolymer, the relative weight percentage of the homopolymer preferably ranges from about 90% to 50%. See col. 5, lines 5-23. Gao teaches placing an electrolyte solution comprising an electrolyte solvent and a salt into said anode, cathode and polymeric compositions (col. 2, lines 9-23) (impregnates a face of the positive and negative electrodes). The cathode may comprise a lithium transition metal oxide and the anode

may comprise carbon (col. 5, lines 59-65). Lithium ion cells are rechargeable. Lamination causes the polymeric components of the anode and cathode precursors to adhere to the polymeric layer (Example 3). The electrochemical cell includes an electrolytic solvent such as an organic carbonate (col. 5, lines 36-67). Typical solvents include propylene carbonate and ethylene carbonate (plasticizer of instant invention, see page 17, lines 1-9 of specification). The polymeric matrix is mixed with dibutyl phthalate (ester) and the polymeric layer is formed such that the electrolyte solution (salt and solvent) fills the pores created by the extraction of the dibutyl phthalate (ester solvent of the instant invention). See col. 10, lines 28-48.

Gao teaches a fluoropolymer blend of a homopolymer having a typical molecular weight in the range of 50,000 to 900,000 and a copolymer having a typical molecular weight in the range of 10,000 to 900,000. Gao further teaches a polymer blend of a homopolymer having a typical molecular weight in the range of 50,000 to 900,000 and a terpolymer having a typical molecular weight in the range of 10,000 to 900,000. See col. 4, lines 44-65 and col. 5, lines 6-23). Gao teaches preferably the polymers forming the fluoropolymer blend have a high average molecular weight. Preferably the average molecular weight is between 50K to 750K, more preferably 50K to 200K (col. 10, lines 49-57).

Gao does not explicitly teach the concentration of electrolyte salt in the electrolyte solution is 0.5-2.0 mols/liter.

However, Andrieu teaches an electrolyte solution for a lithium battery comprising a mixture of lithium salts in a non-aqueous solvent. The solvent comprises propylene carbonate, ethylene carbonate and dimethyl carbonate. The mixed salts had a total concentration of 1.6

mols/liter (col. 5, lines 54-61). Andrieu teaches a polyvinylidene fluoride (PVDF) matrix polymer separator (col. 6, lines 30-34).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the electrolyte solution (solvent and salt) of Andrieu for the electrolyte solution of Gao. Gao provides motivation to vary the concentration of salt in the electrolyte solution. Gao teaches the electrolyte typically comprises from about 5 to about 25 weight percent of the inorganic ion salt based on the total weight of the electrolyte depending on the type of salt and electrolytic solvent employed. Furthermore, Gao teaches the solvent may be a mixture of ethylene carbonate, propylene carbonate and dimethyl carbonate. Gao teaches the salt may be $LiN(CF_3SO_2)_2$ and $LiClO_4$ (col. 5, lines 24-65). Thus one of skill would be motivated to use the electrolyte solution disclosed by Andrieu because Gao teaches the specific solvents and salts comprising the electrolyte solution of Andrieu. One of skill would be motivated to combine Gao and Andrieu because both references are directed to solid polymer electrolytes for lithium batteries.

Response to Arguments

Applicant's arguments with respect to claims 10 and 13-17 have been considered but are moot in view of the new ground(s) of rejection.

Note the only limitation of the claimed invention not explicitly taught by Gao is the concentration of salt. Evidence of unexpected results has not been provided relating to the concentration of the salt. Furthermore, Gao has been combined with Andrieu to render the claimed invention obvious in view of the prior art.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is (703) 308-8821. The Examiner may normally be reached Monday-Thursday (9:00 AM-7:30 PM). My supervisor is Pat Ryan, who can be reached at (703) 308-2383. The Art Unit receptionist can be reached at (703) 308-0661 and the official fax numbers are 703-872-9310 (after non-final) and 703-872-9311 (after final).

8/9/03

Tracy Dove
Patent Examiner
Technology Center 1700
Art Unit 1745